COMMONWEALTH OF VIRGINIA
Department of Environmental Quality
Northern Regional Office

STATEMENT OF LEGAL AND FACTUAL BASIS

Michigan Cogeneration Systems, Inc.
Lorton, Fairfax County, Virginia
Permit No. NRO - 71961

Title V of the 1990 Clean Air Act Amendments required each state to develop a permit program to ensure that certain facilities have federal Air Pollution Operating Permits, called Title V Operating Permits. As required by 40 CFR Part 70 and 9 VAC 5 Chapter 80, Michigan Cogeneration Systems, Inc. has applied for a Title V Operating Permit renewal for its Lorton, Virginia facility. The Department has reviewed the application and has prepared a draft Title V Operating Permit.

Engineer/Permit Contact:_____ Date:
Elizabeth Aiken
(703) 583-3890

Air Permit Manager:_____ Date:

Regional Director:_____ Date:

FACILITY INFORMATION

Permittee
Michigan Cogeneration Systems, Inc.
46280 Dylan Drive, Suite 200
Novi, MI. 48377

Facility
Michigan Cogeneration Systems, Inc.
9850 Furnace Road
Lorton, VA. 22079

County-Plant Identification Number: 51-059-0575

SOURCE DESCRIPTION - SIC Code: 4911 – Electric Services

The facility operates eight internal combustion engines which combust landfill gas, generated by the adjacent I-95 Landfill, to produce electricity for re-sale. Each engine is a Caterpillar model 3516, rated at 8.5 MMBtu/hr heat input and 800 kW of electrical output while firing landfill gas. Natural gas can be used as an auxiliary fuel.

The facility is a Title V major source of nitrogen oxides (NO_x) and carbon monoxide (CO), and is a PSD major source for CO. This source is located in a Fairfax County Virginia, which is part of the Northern Virginia Ozone Nonattainment Area, and is classified as Moderate nonattainment for ozone. As a result, the source is a nonattainment major source for NO_x. The county and region is in attainment with the National Ambient Air Quality Standards (NAAQS) for all other criteria pollutants.

The facility operates under a State Air Pollution Control Board new source review permit dated December 17, 2002 and a State Operating Permit (SOP), dated May 10, 2000, which implemented Reasonably Available Control Technology (RACT) requirements for volatile organic compounds (VOCs) and nitrogen oxides (NO_x).

COMPLIANCE STATUS

The facility is inspected once every two years by the Virginia DEQ. The last inspection was conducted on August 24, 2011. The facility is currently in compliance.

EMISSION UNIT AND CONTROL DEVICE IDENTIFICATION

The emissions units at this facility consist of the following:

Table 1. Significant Emission Units at Michigan Cogeneration

Emission Unit ID	Stack ID	Emission Unit Description	Size/Rated Capacity*	Pollution Control Device (PCD) Description	PCD ID	Pollutant Controlled	Applicable Permit Date
Internal Combustion Engines							
P1-1	S1	Phase I - Caterpillar Internal Combustion Engine No. 1, Model 3516, landfill gas-fired	8.55 MMBtu/hr heat input, 800 kW power output	---	---	---	12/17/02 and 5/10/00
P1-2	S2	Phase I - Caterpillar Internal Combustion Engine No. 2, Model 3516, landfill gas-fired	8.55 MMBtu/hr heat input, 800 kW power output	---	---	---	12/17/02 and 5/10/00
P1-3	S3	Phase I - Caterpillar Internal Combustion Engine No. 3, Model 3516, landfill gas-fired	8.55 MMBtu/hr heat input, 800 kW power output	---	---	---	12/17/02 and 5/10/00
P1-4	S4	Phase I - Caterpillar Internal Combustion Engine No. 4, Model 3516, landfill gas-fired	8.55 MMBtu/hr heat input, 800 kW power output	---	---	---	12/17/02 and 5/10/00
P2-1	S5	Phase II - Caterpillar Internal Combustion Engine No. 1, Model 3516, landfill	8.55 MMBtu/hr heat input, 800 kW power	---	---	---	12/17/02 and 5/10/00

Emission Unit ID	Stack ID	Emission Unit Description	Size/Rated Capacity*	Pollution Control Device (PCD) Description	PCD ID	Pollutant Controlled	Applicable Permit Date
		gas-fired	output				
P2-2	S6	Phase II - Caterpillar Internal Combustion Engine No. 2, Model 3516, landfill gas-fired	8.55 MMBtu/hr heat input, 800 kW power output	---	---	---	12/17/02 and 5/10/00
P2-3	S7	Phase II - Caterpillar Internal Combustion Engine No. 3, Model 3516, landfill gas-fired	8.55 MMBtu/hr heat input, 800 kW power output	---	---	---	12/17/02 and 5/10/00
P2-4	S8	Phase II - Caterpillar Internal Combustion Engine No. 4, Model 3516, landfill gas-fired	8.55 MMBtu/hr heat input, 800 kW power output	---	---	---	12/17/02 and 5/10/00

EMISSIONS INVENTORY

A copy of the 2011 annual emission update is attached. Emissions are summarized in the following tables.

2011 Actual Criteria Pollutant Emissions

	2011 Criteria Pollutant Emission in Tons/Year				
	VOC	CO	SO_2	PM_{10}	NO_x
Total	12.428	179.514	5.122	14.937	103.566

2011 Facility Hazardous Air Pollutant Emissions

Pollutant	2011 Hazardous Air Pollutant Emission in Tons/Yr
Hydrochloric acid (hydrogen chloride [gas only])	7.437
Methylene chloride (Dichloromethane)	0.137
Tetrachloroethylene (Perchloroethylene)	0.070
1,1,2-Trichloroethane	0.007

EMISSION UNIT APPLICABLE REQUIREMENTS - (Emission Units P1-1, P1-2, P1-3, P1-4, P2-1, P2-2, P2-3, and P2-4)

Limitations

Condition 1,2 and 3: Control of NO_x, CO and VOC (to a limited degree) is maintained by operating the engines at an appropriate air-fuel ratio. This air-fuel ratio is set very low (i.e., very lean) initially. Subsequent stack testing for NO_x, CO and VOC emissions confirms that the air-fuel setting is adequate to allow the engines to achieve compliance with the emission limits. Beyond the performance testing, monitoring of exhaust oxygen content is used to confirm that the appropriate air-fuel ratio is maintained continuously (i.e., within a range established during the performance testing). Thus Condition 3 provides a range of exhaust oxygen content for which the engines must be maintained to indicate proper operation and to establish reasonable assurance of continuous compliance with the NO_x and CO limits, and to a lesser degree VOC limits. The range of +/- 0.5 percent was established based on experience with engines and a recommendation by EPA Region III regarding landfill gas-fired engines operating under NSPS WWW (though these units pre-date WWW and are not subject to its requirements). Note however that an alternative range can be established based on the performance testing to be conducted as required by Condition 20 of this permit. This monitoring program also serves to satisfy Condition 7 of the RACT permit.

Condition 4 and 5: Control of VOC is not directly attributed to maintaining a lean air-fuel ratio, but is controlled by the engines operating at high enough temperatures to destroy VOCs. Thus exhaust stack temperature monitoring provisions have been added to address periodic monitoring for VOC emissions limits since the underlying new source review permit does not adequately address this. A range of 50 ˚F was established based on experience with typical temperature fluctuations in cylinders of engines operating at base-load. Note however that an alternative range can be established based on the performance testing to be conducted as required by Condition 20 of this permit. This monitoring program also serves to satisfy Condition 7 of the RACT permit.

Condition 8: This condition combines emission limits from the new source review permit and the State Operating Permit implementing RACT.

Condition 11: “Proper operation and maintenance” is a general requirement provided to add a measure of confidence that the engines will be consistently maintained and operated as they are intended with respect to minimizing all criteria pollutant emissions, but primarily NO_x and CO, the products of combustion. Confidence is gained knowing that the operators will be trained in manufacturer methods and procedures, at a minimum. This is particularly important for CO and visible emissions since there is no other periodic monitoring strategy, which specifically

addresses either in this permit. In addition, so long as the engines are operated and maintained properly, it is unlikely that the visible emissions limit will be exceeded. This position is supported by EPA (Eric Schaeffer and John Seitz memo dated 9/15/98) when burning pipeline grade natural gas and can be assumed to be supported for landfill gas which is similar with respect to particulate creating components.

Monitoring and Record Keeping

The purpose of the Monitoring and Record Keeping section in the permit is to provide a reasonable assurance of continuous compliance with NO_x, CO, VOC and visible emissions limitations. This is achieved through a combination of conditions from the 12/17/02 permit, requirements added to supplement the12/17/02 conditions, and new requirements meant to address periodic monitoring for the NO_x and VOC emission limits in the RACT permit.

Discussion is provided below for Conditions where additional explanation is necessary:

Condition 12: Exhaust oxygen content was identified as a parameter to monitor to ensure the appropriate air-fuel mix is maintained, for control of NO_x and CO. The frequency of two engines monitored each day of weekday operations was a compromise reached with the source during review of the draft operating and minor New Source Review permit. A minimum of 65 readings will be recorded for each engine annually. The permittee may elect to develop an alternative schedule of monitoring after collecting engine operations and emissions data for one year, and DEQ agrees with the proposed schedule.

Condition 13: Exhaust manifold temperature was identified as a parameter to monitor to ensure proper destruction of landfill gas VOCs. This requirement was added to strengthen periodic monitoring and to assure that VOCs will be destroyed adequately regardless of the concentration in the influent landfill gas.

Condition 14 and 15: A quarterly program of snapshot NO_x and VOC monitoring was developed to strengthen periodic monitoring. This snapshot approach, provided by the source, would include a five-minute measurement for NO_x and VOCs on each engine every three months. A properly calibrated and certified portable gas analyzer would take the measurements. The average concentrations calculated from these measurements will be compared to concentrations recorded during performance testing and provide an indicator of compliance with the emission limits. The permittee may elect to develop an alternative schedule of testing after collecting engine operations and emissions data for one year, and DEQ agrees with the proposed schedule.

Condition 16: Provides the minimum data necessary to be able to demonstrate compliance or provide an indicator of compliance with emission limits.

Condition 17: Provides record keeping requirement necessary to demonstrate compliance or provide an indicator of compliance with all applicable limitations.

Corrective Actions

Conditions 18 and 19: Corrective actions have been added to the permit under the premise of periodic monitoring to ensure that appropriate maintenance actions are taken when parameter values are exceeded. Once tuning or maintenance is performed and parameters are returned to their proper values, a snapshot test using a portable analyzer is required to provide reasonable assurance that the engines are in compliance with the emission limits.

Testing

Conditions 20 and 21: Requires the permittee to conduct Reference Method testing for NO_x, CO and VOC on each engine to demonstrate compliance with the lb/hr and lb/kw-hr emission limits. The performances testing also presents an opportunity to provide data correlating air-fuel ratio to exhaust oxygen, and exhaust oxygen to NO_x and CO emissions, and exhaust stack temperature to VOC emissions. A range of operating conditions during the testing may be necessary to provide a valuable set of date. Condition 21 lists the appropriate methods available for conducting these tests.

Reporting

The permit includes two reporting requirements carried over from the underlying new source review permit

Insignificant Emissions Unit

Insignificant emission units include the following:

Emission Unit No.	Emission Unit Description	Citation	Pollutant(s) Emitted (9 VAC 5-80-720 B)	Rated Capacity 9 VAC 5-80-720 C)
Lube 1	Lube oil storage tank	9 VAC 5-80-720B	VOC	2,500 gallon
Waste 1	Waste oil storage tank	9 VAC 5-80-720B	VOC	1,000 gallon
T-1	Condensate holding tank	9 VAC 5-80-720C	VOC	200 gallon
T-2	Condensate holding tank	9 VAC 5-80-720C	VOC	200 gallon
Crank 1	Engine crankcase oil storage vents	9 VAC 5-80-720B	VOC	Unknown

[1]The citation criteria for insignificant activities are as follows:
9 VAC 5-80-720 A - Listed Insignificant Activity, Not Included in Permit Application
9 VAC 5-80-720 B - Insignificant due to emission levels
9 VAC 5-80-720 C - Insignificant due to size or production rate

The insignificant emission units are presumed to be in compliance with all requirements of the Clean Air Act as may apply. Based on this presumption, no monitoring, recordkeeping or reporting shall be required for these emission units in accordance with 9 VAC 5-80-110.

Inapplicable Requirements

There are no applicable GHG requirements.
40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines;

Streamlined Requirements

Minor NSR Permits - No streamlining was necessary.

State Operating Permit - Two conditions in the State Operating Permit were excluded as applicable requirements. First, Condition 8 requires notification to the succeeding owner when ownership changes. This requirement is accommodated in General Conditions 54 - 56 of this permit. Second, Condition 9 requires the permit be maintained on the premises of the facility. This requirement is accommodated in General Condition 53 of this permit.

GENERAL CONDITIONS

The permit contains general conditions required by 40 CFR Part 70 and 9 VAC 5-80-110 that apply to all Federal-operating permitted sources. These include requirements for submitting semi-annual monitoring reports and an annual compliance certification report. The permit also requires notification of deviations from permit requirements or any excess emissions.

Comments on General Conditions

Permit Expiration

These conditions refer to the Board taking action on a permit application. The Board is the State Air Pollution Control Board. The authority to take action on permit applications has been delegated to the Regions as allowed by §2.2-604 and §10.1-1185 of the *Code of Virginia,* and the "Department of Environmental Quality Agency Policy Statement No. 2-09".

These general conditions cites the Article that follow:
Article 1 (9 VAC 5-80-50 et seq.), Part II of 9 VAC 5 Chapter 80. Federal Operating Permits for Stationary Sources

Failure/Malfunction Reporting

Section 9 VAC 5-20-180 requires malfunction and excess emission reporting within four hours of discovery. Section 9 VAC 5-80-250 of the Title V regulations also requires malfunction reporting; however, reporting is required within two days. Section 9 VAC 5-20-180 is from the general regulations. All affected facilities are subject to section 9 VAC 5-20-180 including Title V facilities. Section 9 VAC 5-80-250 is from the Title V regulations. Title V facilities are subject to both sections. A facility may make a single report that meets the requirements of 9 VAC 5-20-180 and 9 VAC 5-80-250. The report must be made within four daytime business hours of discovery of the malfunction.

This general condition cites the sections that follow:

9 VAC 5-40-41. Emissions Monitoring Procedures for Existing Sources
9 VAC 5-40-50. Notification, Records and Reporting
9 VAC 5-50-50. Notification, Records and Reporting

Permit Modification

This general condition cites the sections that follow:
9 VAC 5-80-50. Applicability, Federal Operating Permit For Stationary Sources
9 VAC 5-80-190. Changes to Permits.
9 VAC 5-80-260. Enforcement.
9 VAC 5-80-1100. Applicability, Permits For New and Modified Stationary Sources
9 VAC 5-80-1605. Applicability, Permits For Major Stationary Sources and Modifications Located in Prevention of Significant Deterioration Areas
9 VAC 5-80-2000. Applicability, Permits for Major Stationary Sources and Major Modifications Locating in Nonattainment Areas

Malfunction as an Affirmative Defense

The regulations contain two reporting requirements for malfunctions that coincide. The reporting requirements are listed in sections 9 VAC 5-80-250 and 9 VAC 5-20-180. The malfunction requirements are listed in General Conditions 57 thru 60.

Federal Only Applicable Requirements

The Commonwealth of Virginia has not accepted delegation of the following applicable requirements which are required under the federal Clean Air Act and/or any of its applicable federal requirements:

40 CFR 63, Subpart ZZZZ: National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

Authority to enforce these standards is retained by EPA. They are not incorporated by reference

into the Virginia regulations.

PUBLIC PARTICIPATION

The proposed permit will be place on public notice in the [newspaper] from [date] to [date] .